

**FACT SHEET FOR NPDES PERMIT
NO. WA-002434-1**

**CITY OF ELLENSBURG
PUBLICLY-OWNED TREATMENT WORKS**

SUMMARY

The City is seeking reissuance of its National Pollutant Discharge Elimination System (NPDES) permit for its Publicly Owned Treatment Works (POTW). The POTW consists of approximately 66 miles of sewers, three pump stations and a wastewater treatment plant. Wastewater receives secondary-level treatment in an complete mix aeration process and ultraviolet disinfection, and is then discharged through a submerged outfall into the Yakima River.

The City has requested, and will receive in the proposed permit, coverage for one combined sewer overflow discharge per year. Approximately ten percent of the collection system is comprised of combined sanitary-storm sewers. The City has dedicated resources, on a continuing basis, to removing storm water catchment basins from the sanitary sewer system. Storm water catchment basins disconnected from sanitary sewer system are connected to the separate storm water collection system maintained by the City. In June 2005 the Association of Washington Cities awarded the City a Certification of Excellence for its well-managed sewer inspection and maintenance program.

This permit requires: compliance with effluent limitations; implementation of the self-monitoring program; and, submittal of a Combined Sewer Overflow Reduction Plan Update. The City must also evaluate the infiltration and inflow (I&I) into its collection system annually and assess loadings to its treatment plant once during the upcoming permit cycle. In addition, the City is required to carry out whole effluent toxicity testing in the third year of the permit cycle. This permit also requires the City to characterize the Yakima River and its treatment plant effluent for metals.

TABLE OF CONTENTS

	<u>Page</u>
SUMMARY	1
INTRODUCTION	4
GENERAL INFORMATION	5
BACKGROUND INFORMATION	5
DESCRIPTION OF THE FACILITY	5
History	5
Collection System Status	6
Treatment Processes	7
Discharge Outfall	7
Residual Solids	8
PERMIT STATUS	8
SUMMARY OF COMPLIANCE WITH THE PREVIOUS PERMIT	8
Compliance with Effluent Limits and Monitoring Requirements	8
Compliance with Submittal Requirements	9
WASTEWATER CHARACTERIZATION	9
Influent	9
Effluent	10
Conventional Parameters	10
Ammonia	10
Chloride	11
Dissolved Oxygen and Temperature	11
Priority Pollutants	12
PROPOSED PERMIT LIMITATIONS	12
DESIGN CRITERIA	13
TECHNOLOGY-BASED EFFLUENT LIMITATIONS	13
SURFACE WATER QUALITY-BASED EFFLUENT LIMITATIONS	14
Numerical Criteria for the Protection of Aquatic Life	15
Numerical Criteria for the Protection of Human Health	15
Narrative Criteria	15
Antidegradation	15
Critical Conditions	16
Mixing Zones	16
Revised 7Q10	16
Calculation of Dilution Factors	17
Description of the Receiving Water	18
Surface Water Quality Criteria	19

CONSIDERATION OF SURFACE WATER QUALITY-BASED LIMITS FOR	20
NUMERIC CRITERIA.....	20
Ammonia	22
Chloride	22
Copper and Zinc	23
Whole Effluent Toxicity	23
Human Health.....	24
Sediment Quality	25
GROUND WATER QUALITY LIMITATIONS.....	25
COMPARISON OF EFFLUENT LIMITS WITH THE EXISTING PERMIT	25
MONITORING requirements.....	25
LAB ACCREDITATION	26
OTHER PERMIT CONDITIONS	27
REPORTING AND RECORDKEEPING	27
PREVENTION OF FACILITY OVERLOADING.....	27
OPERATION AND MAINTENANCE (O&M).....	27
RESIDUAL SOLIDS HANDLING.....	27
PRETREATMENT	28
Duty to Enforce Discharge Prohibitions.....	28
COMBINED SEWER OVERFLOWS	28
GENERAL CONDITIONS	29
PERMIT ISSUANCE PROCEDURES	29
PERMIT MODIFICATIONS	29
RECOMMENDATION FOR PERMIT ISSUANCE.....	29
REFERENCES FOR TEXT AND APPENDICES.....	29
APPENDIX A -- PUBLIC INVOLVEMENT INFORMATION.....	31
APPENDIX B -- GLOSSARY	32
APPENDIX C -- RESPONSE TO COMMENTS	37

INTRODUCTION

The Federal Clean Water Act (FCWA, 1972, and later modifications, 1977, 1981, and 1987) established water quality goals for the navigable (surface) waters of the United States. One of the mechanisms for achieving the goals of the Clean Water Act is the National Pollutant Discharge Elimination System of permits (NPDES permits), which is administered by the Environmental Protection Agency (EPA). The EPA has authorized the State of Washington to administer the NPDES permit program. Chapter 90.48 RCW defines the Department of Ecology's authority and obligations in administering the wastewater discharge permit program.

The regulations adopted by the State include procedures for issuing permits (Chapter 173-220 WAC), technical criteria for discharges from municipal wastewater treatment facilities (Chapter 173-221 WAC), water quality criteria for surface and ground waters (Chapters 173-201A and 200 WAC), and sediment management standards (Chapter 173-204 WAC). These regulations require that a permit be issued before discharge of wastewater to waters of the State is allowed. The regulations also establish the basis for effluent limitations and other requirements which are to be included in the permit. One of the requirements (WAC 173-220-060) for issuing a permit under the NPDES permit program is the preparation of a draft permit and an accompanying fact sheet. Public notice of the availability of the draft permit is required at least thirty days before the permit is issued (WAC 173-220-050). The fact sheet and draft permit are available for review (see Appendix A--Public Involvement of the fact sheet for more detail on the Public Notice procedures).

The fact sheet and draft permit have been reviewed by the Permittee. Errors and omissions identified in this review have been corrected before going to public notice. After the public comment period has closed, the Department will summarize the substantive comments and the response to each comment. The summary and response to comments will become part of the file on the permit and parties submitting comments will receive a copy of the Department's response. The fact sheet will not be revised. Comments and the resultant changes to the permit will be summarized in Appendix C--Response to Comments.

GENERAL INFORMATION	
Applicant	City of Ellensburg
Facility Name and Address	City of Ellensburg Publicly-Owned Treatment Works 2415 Canyon Road Ellensburg, WA 98926
Type of Treatment:	Activated Sludge, Aeration Basins, Secondary Clarification and Ultraviolet Disinfection
Discharge Location Outfall 001	Yakima River Latitude: 46° 57' 48" N Longitude: 120° 32' 52" W.
Waterbody ID Numbers	WA-39-1030 (Old) EB21AR (New)
Discharge Location Outfall 002	Wilson Creek Latitude: 46° 58' 06" N Longitude: 120° 32' 16" W.
Waterbody ID Numbers	WA-39-1020 (Old) PY59BF (New)

BACKGROUND INFORMATION

DESCRIPTION OF THE FACILITY

History

Prior to 1974 wastewater treatment was provided at a primary-level treatment facility. In 1974 the original primary treatment facility was taken out of normal service and a secondary treatment facility was put into service. At that time the wastewater collection system was modified so that in the event of a major storm, if flow to the secondary treatment plant reaches plant capacity, excess flows were diverted at an overflow structure to the primary treatment plant. In 2001, the City isolated this facility from the sanitary sewer system by permanently sealing the influent pipe with cement. This facility will not be further addressed in this fact sheet or permit.

In June 1991, the City retained HDR Engineering, Inc. to comprehensively assess the POTW (wastewater collection and treatment system). The final report, *The City of Ellensburg Wastewater-Storm Sewer Study*, August 1992, forecasted growth for the period 1992 through 2011 and the associated demands on the POTW. The study was used to prepare a Capital Improvement Program, which identified necessary system improvements and ways to fund these improvements.

The study focused on several areas of concern including: compliance with the low (0.1 mg/L) residual chlorine effluent limit established in the just-issued NPDES permit; high infiltration and inflow (I&I) rates; and, sludge management. The City dealt with the stringent residual chlorine

effluent limits by installing an ultraviolet (UV) light disinfection system. High I&I rates are being addressed with an ongoing program of identifying sources of I&I and reducing or eliminating those sources.

The City submitted an updated *Wastewater-Storm Sewer Study* to the Department in February 2001. The updated study was not required by the Department and has not been formally approved, but the Department encourages the proactive planning typical of the City. The updated study identifies system improvements to address deficiencies for five year period from 2002 to 2007, and improvements to accommodate anticipated growth through 2020. The study assesses the sanitary and storm water collection systems and the wastewater treatment plant. Recommendations are also included for the development and implementation of a local stormwater management program.

Many of the recommendations for the 2002-2007 time frame have already been implemented. For example, at the treatment plant, the surface aerators in the aeration basins and the influent pump station variable speed control units have been replaced. In addition, a recirculating pump in the biosolids treatment system has been replaced and the piping upgraded. The City also has a progressive program of relining or replacing sewer pipe, as appropriate, and separating combined sewers as opportunities arise.

Collection System Status

The City of Ellensburg wastewater collection system presently serves an area of approximately 4,254 acres. Much of the collection system was constructed in the 1930's and utilized vitrified clay pipe or concrete pipe with unsealed or mortar joints. Additions to the system constructed from approximately 1960 to 1980 utilized asbestos cement pipe or concrete pipe with modern compression-type pipe gaskets. Most additions to the system since 1980 utilized PVC pipe material with compression gaskets.

The City owns and operates three pumping stations in the collection system. In addition, there are a number of privately owned and operated pumping facilities, which are connected to the collection system.

Historically, there has been a significant problem with infiltration and inflow to the collection system, and during the last ten years the City has worked hard to reduce the problem. Infiltration is attributed to the rise of water tables during the spring and summer months due to irrigation in the surrounding agricultural areas. Inflow is attributed primarily to storm events.

The City has an ongoing program of corrective and preventive maintenance to reduce infiltration and inflow (I&I) to the collection system. Sections of the collection system that become blocked are water-jetted clear and closely monitored for further blockages. Preventative measures include routine inspection of pipes with television equipment. In addition, each year the City

budgets some funds for replacement of sewers to eliminate excess infiltration and removal of the direct connections of catch basins to the sanitary sewer.

During the existing permit cycle the City submitted annual I&I Evaluations. Summary data contained in the most recent, 2004 evaluation illustrates the City's progress. The data are presented in the following table. Data reflect 12-month periods from June 1st to the following May 31st.

Table 1: Summary of City of Ellensburg I&I

Year, June 1st to May 31st	2003-2004	2002-2003	2001-2002	2000-2001	1999-2000
Daily Average, in MGD	2.84	2.96	2.83	3.04	2.9
"Non-excessive" flow, in MGD (based on population)	2.05	1.98	1.98	1.93	1.72
Annual Average I&I, in MGD	0.79	0.98	0.83	1.11	1.14

Non-excessive flow is the product of the estimated population multiplied by 125 gallons per capita per day (gpcd), the threshold flow volume EPA has established as excessive I&I. While the non-excessive flow value may not reflect the actual per capita hydraulic loading to the treatment plant, the City has used this benchmark value for many years, so the resulting value provides a relative measure of flows. The stable or declining flow data in the table should be taken in the context that the population of the City has increased approximately 1,300 people since the 2000 census (State Office of Financial Management, June 28, 2005).

Treatment Processes

The main treatment plant utilizes an extended aeration-activated sludge process, which provides secondary treatment for the City of Ellensburg's wastewater. Treatment processes consist of a headworks with grit removal and fine screening, two (2) aeration basins, two (2) secondary clarifiers, sludge return facilities, primary and secondary anaerobic digesters, centrifuge, lagoons for supernatant from anaerobic digesters, sludge drying beds, ultraviolet disinfection, outfall line with diffuser, and process control buildings.

Discharge Outfalls

Outfall 001

The treatment plant discharges treated and disinfected effluent from the facility's ultraviolet disinfection chamber via a 2,800-foot long outfall pipe to the Yakima River, at River Mile 151.6. The outfall pipe is terminated by a 20-foot long diffuser with six (6) integral ports. The diffuser ports are approximately one-half foot below the water's surface and forty-three (43) feet from shore during the season of receiving water low flows (summer).

Outfall 002

Outfall 002 begins at manhole #8, which is located just upstream of the raw sewage pump station, and discharges to Wilson Creek, adjacent to the main treatment plant. This outfall serves as an emergency bypass discharge point for the main treatment plant. This outfall has been utilized only once in the past ten years, during the extreme flooding that occurred in February 1996.

Residual Solids

The treatment facilities remove solids during the treatment of the wastewater at the headworks (grit and screenings), and at the secondary clarifiers, in addition to incidental solids (rags, scum, and other debris) removed as part of the routine maintenance of the equipment. Grit, rags, scum and screenings are drained and disposed of as solid waste at the local landfill. Solids removed from the secondary clarifier are treated by anaerobic digestion and land applied at Natural Selection Farms.

PERMIT STATUS

The previous permit for this facility was issued on March 30, 2001. The previous permit placed effluent limitations on 5-day biochemical oxygen demand (BOD₅), total suspended solids (TSS), pH, fecal coliform bacteria, and total ammonia.

An application for permit renewal was received by the Department on May 6, 2005 and accepted by the Department on May 19, 2005.

SUMMARY OF COMPLIANCE WITH THE PREVIOUS PERMIT

A compliance inspection without sampling was conducted on July 13, 2005.

During the history of the previous permit, the Permittee has generally remained in compliance, based on Discharge Monitoring Reports (DMRs) submitted to the Department and inspections conducted by the Department.

Compliance with Effluent Limits and Monitoring Requirements

The Department has taken no formal enforcement actions against the City during the existing permit cycle. However, the Permittee encountered a series of minor incidents with the operation of its treatment plant and collection system during the existing permit cycle that resulted in the issuance of several informal letters.

Informal letters of enforcement were sent to the City in May and October of 2003 for single exceedances of the maximum daily effluent limit. The exceedances occurred in February and

August of 2003. The City reported that the February exceedance was due to a surreptitious discharge of septage to the collection system. The cause of the August exceedance was suspected to be the draining of two large public swimming pools to the treatment plant on the same day.

On August 13, 2003, a power outage occurred at the treatment plant for a period of approximately one hour. Both the automatic alarm system and the automatic start switch for the emergency generator failed. Approximately 6,600 gallons of biologically treated, but non-disinfected wastewater was discharged to the Yakima River.

The City's collection system suffered several overflows during the last five years, most due to infiltration of tree roots into sewer pipes. The City has an comprehensive and proactive maintenance plan for its collection system, which is more fully discussed in the Operations and Maintenance section of this fact sheet.

Finally, the influent meter at the treatment plant failed, resulting in *estimated* loadings to the treatment plant and the receiving water. The problem continued for several months, due to the reluctance of the manufacturer to fulfill the just-expired warrantee, and then the time to find and install a new flow meter.

Compliance with Submittal Requirements

As a major municipal discharger, the Permittee was required to conduct a suite of routine assessments and submit the associated reports. The assessments included, infiltration and inflow (I&I) evaluations, a wasteload assessment, whole effluent toxicity (WET) tests, and a combined sewer overflow plan. All reports were received by the Department on or before the respective due dates. Discussion of the findings of each of the reports is contained in the applicable section of this fact sheet.

WASTEWATER CHARACTERIZATION

Influent

BOD and TSS loadings to the POTW for calendar year 2004 were reported in DMRs submitted to the Department and are compared with the applicable design criteria as follows:

Table 2: Influent Characterization

Parameter	Characterization		Design Criteria
	2004 Average	Highest Average Monthly	Monthly Average for the Maximum Month
BOD ₅ , in lbs/day	3606	4,646	10,000
TSS, in lbs/day	2979	3,385	8,000

Loadings to the treatment plant are well below the design loadings.

Effluent

The concentration of pollutants in the discharge during calendar year 2004 was reported in the NPDES application and in DMRs.

Conventional Parameters

The existing permit regulates BOD₅, TSS and Fecal Coliform Bacteria in the discharge with average monthly and average weekly effluent limits. The effluent is characterized for BOD, TSS and Fecal Coliform Bacteria in the following table. The effluent limits in the existing permit are provided for context.

Table 3: 2004 Conventional Parameters Effluent Characterization

Parameter	Characterization			Existing Permit Limits	
	2004 Average	Highest Average Monthly	Highest Average Weekly	Average Monthly	Average Weekly
BOD ₅ , in mg/L	3.4	4.9	9.0	30	45
TSS, in mg/L	4.4	6.4	7.0	30	45
Fecal Coliform Bacteria, in #colonies/100 mL	3.0	6.0	14.0	100	200

As the data presented in the table show, the effluent quality discharged from the treatment plant continues to be excellent. BOD₅ and TSS removal rates are typically between 95% and 99%.

The minimum pH reported during 2004 was 6.7 and the maximum was 7.4.

Ammonia

Total Ammonia is regulated in the existing permit through a maximum daily limit. The effluent is characterized for Total Ammonia in the following table. The effluent limit in the existing permit is provided for context.

Table 4: 2004 Ammonia Effluent Characterization

Parameter	Characterization		Existing Permit Limit
	Annual Average	Highest Daily Value	Maximum Daily
Total Ammonia, in mg/L	1.05	5.11	8.2 mg/L

Chloride

In early July 2005, after the permit application was accepted, the City allowed a local food processor to discharge pea brine wastewater to the treatment plant on a trial basis. Historically, the pea brine water has been discharged by the company to its leased sprayfield near the treatment plant, but the discharge has contributed to exceedances of the ground water quality criteria for dissolved solids.

The discharge to the City occurred over a ten day period. During this time, the City sampled the treatment plant discharge to the river three times. The results were as follows:

Table 5: Chloride Effluent Characterization

Parameter	Characterization		
Chloride, in mg/L	36.8	29.7	67.3

Dissolved Oxygen and Temperature

Dissolved Oxygen (DO) and Temperature in the discharge are not regulated in the existing permit; however, the City is required to monitor these parameters and report the results on its DMRs. The minimum concentration of DO is given because the surface water quality criterion is established as a minimum concentration. Temperature data reflect the discharge during warm weather months.

These data are used to determine the reasonable potential for Dissolved Oxygen and Temperature in the discharge, after dilution, to exceed the water quality standards. See the section of this fact sheet, CONSIDERATION OF SURFACE WATER QUALITY-BASED LIMITS FOR NUMERIC CRITERIA, for further analysis of impact of these discharge parameters on water quality of the river.

Table 6: Dissolved Oxygen and Temperature Effluent Characterization

Parameter	Characterization	
	Annual Average	Daily Value
DO, in mg/L	5.4	2.9 (minimum)
Temperature, in °C	18.3	20.0 (maximum)

Priority Pollutants

Form 2A of the NPDES Permit Application lists 98 priority pollutants in the discharge that must be quantified. One complete priority pollutant scan and a second partial analysis of metals only were taken. Four of the priority pollutants were present in the City's effluent. (Magnesium was also present in the discharge, but there are no water quality criteria for this parameter and it is not considered a priority pollutant.) The concentrations of those priority pollutants that were detected in the discharge are presented in the table below.

Table 7: Priority Pollutant Effluent Characterization

Parameter	Minimum	Maximum	Number of Samples
Copper, in µg/L	6.7	6.3	2
Zinc, in µg/L	25	36	2
bis(2-ethylhexyl)phthalate, in µg/L	--	1.7	1
Toluene, in µg/L	--	0.3	1

The presence of copper, zinc and bis(2-ethylhexyl)phthalate in municipal treatment plant effluent is typical. The concentrations in the City's discharge are also typical of similarly-sized facilities. Toluene occurs less frequently in large municipal discharges.

PROPOSED PERMIT LIMITATIONS

Federal and State regulations require that effluent limitations set forth in a NPDES permit must be either technology- or water quality-based. Technology-based limitations for municipal discharges are set by regulation (40 CFR 133, and Chapters 173-220 and 173-221 WAC). Water quality-based limitations are based upon compliance with the Surface Water Quality Standards (Chapter 173-201A WAC), Ground Water Standards (Chapter 173-200 WAC), Sediment Quality Standards (Chapter 173-204 WAC) or the National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992.) The most stringent of these types of limits must be chosen for each of the parameters of concern. Each of these types of limits is described in more detail below.

The limits in this permit are based in part on information received in the application. The effluent constituents in the application were evaluated on a technology- and water quality-basis. The limits necessary to meet the rules and regulations of the State of Washington were determined and included in this permit. Ecology does not develop effluent limits for all pollutants that may be reported on the application as present in the effluent. Some pollutants are not treatable at the concentrations reported, are not controllable at the source, are not listed in regulation, and do not have a reasonable potential to cause a water quality violation. Effluent limits are not always developed for pollutants that may be in the discharge but not reported as present in the application. In those circumstances the permit does not authorize discharge of the non-reported pollutants. Effluent discharge conditions may change from the conditions reported in the permit application. If significant changes occur in any constituent, as described in 40 CFR 122.42(a), the Permittee is required to notify the Department of Ecology. The Permittee may be in violation of the permit until the permit is modified to reflect additional discharge of pollutants.

DESIGN CRITERIA

In accordance with WAC 173-220-150(1)(g), flows or waste loadings shall not exceed approved design criteria.

The design criteria for this treatment facility are taken from the 1992 *Wastewater-Storm Sewer Study*, an engineering report prepared by HDR Engineering, Inc., and are as follows:

Table 8: Design Criteria for the City of Ellensburg WWTP.

Parameter	Design Quantity
Monthly average flow (max. month)	8 MGD
Instantaneous peak flow	15 MGD
BOD ₅ influent loading	10,000 lbs/day
TSS influent loading	8,000 lbs/day
Design population equivalent	31,000 persons

TECHNOLOGY-BASED EFFLUENT LIMITATIONS

Municipal wastewater treatment plants are a category of discharger for which technology-based effluent limits have been promulgated by Federal and State regulations. These effluent limitations are given in the Code of Federal Regulations (CFR) 40 CFR Part 133 (Federal) and in Chapter 173-221 WAC (State). These regulations are performance standards that constitute all known available and reasonable methods of prevention, control, and treatment for municipal wastewater.

The following technology-based limits for pH, fecal coliform, BOD₅, and TSS are taken from Chapter 173-221 WAC are:

Table 9: Technology-based Limits.

Parameter	Limit
pH:	shall be within the range of 6 to 9 standard units.
Fecal Coliform Bacteria	Monthly Geometric Mean = 200 organisms/100 mL Weekly Geometric Mean = 400 organisms/100 mL
BOD ₅ (concentration)	Average Monthly Limit is the most stringent of the following: - 30 mg/L - may not exceed fifteen percent (15%) of the average influent concentration Average Weekly Limit = 45 mg/L
TSS (concentration)	Average Monthly Limit is the most stringent of the following: - 30 mg/L - may not exceed fifteen percent (15%) of the average influent concentration Average Weekly Limit = 45 mg/L

The following technology-based mass limits are based on WAC 173-220-130(3)(b) and 173-221-030(11)(b).

BOD₅

The monthly average effluent mass loadings (lbs/day) were calculated as:
10,000 lbs/day (monthly design loading) x 0.85 (% removal requirement) = 1,500 lbs/day.

The weekly average effluent mass loadings were calculated as:
1.5 x monthly loading = 2,250 lbs/day.

TSS

The monthly average effluent mass loadings (lbs/day) were calculated as:
8,000 lbs/day (monthly design loading) x 0.85 (% removal requirement) = 1,200 lbs/day.

The weekly average effluent mass loadings were calculated as:
1.5 x monthly loading = 1,800 lbs/day.

SURFACE WATER QUALITY-BASED EFFLUENT LIMITATIONS

In order to protect existing water quality and preserve the designated beneficial uses of Washington's surface waters, WAC 173-201A-060 states that waste discharge permits shall be conditioned such that the discharge will meet established Surface Water Quality Standards. The Washington State Surface Water Quality Standards (Chapter 173-201A WAC) is a State regulation designed to protect the beneficial uses of the surface waters of the State. Water quality-based effluent limitations may be based on an individual waste load allocation (WLA) or on a WLA developed during a basin-wide total maximum daily loading study (TMDL).

Numerical Criteria for the Protection of Aquatic Life

"Numerical" water quality criteria are numerical values set forth in the State of Washington's Water Quality Standards for Surface Waters (Chapter 173-201A WAC). They specify the levels of pollutants allowed in a receiving water while remaining protective of aquatic life. Numerical criteria set forth in the Water Quality Standards are used along with chemical and physical data for the wastewater and receiving water to derive the effluent limits in the discharge permit. When surface water quality-based limits are more stringent or potentially more stringent than technology-based limitations, they must be used in a permit.

Numerical Criteria for the Protection of Human Health

The State was issued 91 numeric water quality criteria for the protection of human health by the U.S. EPA (EPA 1992). These criteria are designed to protect humans from cancer and other disease and are primarily applicable to fish and shellfish consumption and drinking water from surface waters.

Narrative Criteria

In addition to numerical criteria, "narrative" water quality criteria (WAC 173-201A-030) limit toxic, radioactive, or deleterious material concentrations below those which have the potential to adversely affect characteristic water uses, cause acute or chronic toxicity to biota, impair aesthetic values, or adversely affect human health. Narrative criteria protect the specific beneficial uses of all fresh (WAC 173-201A-130) and marine (WAC 173-201A-140) waters in the State of Washington.

Antidegradation

The State of Washington's Antidegradation Policy requires that discharges into a receiving water shall not further degrade the existing water quality of the water body. In cases where the natural conditions of a receiving water are of lower quality than the criteria assigned, the natural conditions shall constitute the water quality criteria. Similarly, when receiving waters are of higher quality than the criteria assigned, the existing water quality shall be protected. More information on the State Antidegradation Policy can be obtained by referring to WAC 173-201A-070.

The Department has reviewed existing records and is unable to determine if ambient water quality is either higher or lower than the designated classification criteria given in Chapter 173-201A WAC; therefore, the Department will use the designated classification criteria for this water body in the proposed permit. The discharges authorized by this proposed permit should not cause a loss of beneficial uses.

Critical Conditions

Surface water quality-based limits are derived for the waterbody's critical condition, which represents the receiving water and waste discharge condition with the highest potential for adverse impact on the aquatic biota, human health, and existing or characteristic water body uses.

Mixing Zones

The Water Quality Standards allow the Department of Ecology to authorize mixing zones around a point of discharge in establishing surface water quality-based effluent limits. Both "acute" and "chronic" mixing zones may be authorized for pollutants that can have a toxic effect on the aquatic environment near the point of discharge. The concentration of pollutants at the boundary of these mixing zones may not exceed the numerical criteria for that type of zone. Mixing zones can only be authorized for discharges that are receiving all known, available, and reasonable methods of prevention, control and treatment (AKART) and in accordance with other mixing zone requirements of WAC 173-201A-100.

The National Toxics Rule (EPA, 1992) allows the chronic mixing zone to be used to meet human health criteria.

Revised 7Q10

Mixing zone dilution factors are revised in the proposed permit to reflect updated information concerning Yakima River flow volumes and effluent flows that occurred during the previous permit cycle. Dilution factors in the previous permit were based on a 7Q10, or low, flow of 210 cubic feet per second (cfs) in the Yakima River. 7Q10 is the lowest seven-day average river flow with a recurrence interval of ten years. The 210 cfs value is based on data collected by the U. S. Bureau of Reclamation, from 1986 through 1995, at a monitoring station near Ellensburg.

However, in 1995, the manner in which flows in the Yakima River are managed underwent a fundamental change. Prior to 1995, the Yakima River was managed by the Bureau to maximize flows to the six downstream irrigation districts. Since 1995, increased instream flows to enhance fish habitat has become an additional management priority. The change was made in accordance with Phase II of the Yakima River Basin Water Enhancement Project, authorized by Title XII of the Act of October 31, 1994 (Public Law 103-434). For this reason the 7Q10 value was recalculated for this permit.

The term 7Q10 is generally associated with the low flow conditions of a natural river. Due to the highly managed nature of the Yakima River watershed--flows are controlled through releases from five dammed reservoirs--the 7Q10 value used in this fact sheet does not reflect the natural hydrologic cycle, but is used to quantify a conservative, low flow condition.

The Bureau's gaging station at Ellensburg was decommissioned in 1995. Therefore, the revised 7Q10 is based on flow data from the Bureau's gaging station located at Umtanum, approximately 11 miles downstream of Ellensburg. There are a few small tributary creeks between Ellensburg and the gauging station; however, the resulting 7Q10 value is very conservative and the Department feels it is representative of the low-flow river condition.

The revised 7Q10 value for this permit is 792 cfs. The following table illustrates the dramatic effect the operating regime change of 1995 has had on Yakima River flows.

Table 10: Flow Adjustments Resulting from River Management Changes

Parameter	1986-1995	1995-2003
7Q10 (low-flow) value, in cfs	210	792
Lowest single-day flow value, in cfs	162	536

Calculation of Dilution Factors

The calculated acute dilution factor utilizes 2.5% of the 7Q10 flow, and the calculated chronic dilution factor utilizes 25% of the 7Q10 flow, in accordance with WAC 173-201A-100.

Regarding effluent flows, the acute dilution factor incorporates the highest daily flow reported during the last three years, and the chronic dilution factor uses the highest monthly average flow reported during the last three years. Use of these flows are as recommended in the Department's *Permit Writers Manual* (Appendix 6, p. 3). Flows are expressed as cubic feet per second.

The following formula was used to determine the dilution factors:

$$DF = (Qa + Qe)/Qe$$

where: DF = Dilution factor

Qa = Ambient flow volume of Yakima River

Qe = Effluent flow volume.

The flow values used in the calculations were:

Table 11: Flow Values Used to Calculate Dilution Factors

Value	Ambient flow (Qa), in cfs	Effluent flow (Qe), in cfs
Acute	19.8	6.61
Chronic	198	5.32

In accordance with recommendations in the *Permit Writers Manual*, dilution factors were developed using two methods: a mass-balance algorithm and the Department's Rivplume5

spreadsheet. The more stringent results of the two methods must be implemented into the permit. The mass-balance calculations and the Rivplume5 spreadsheet are contained in Appendix C of this fact sheet. A summary of the existing dilution factors and the results of the mass-balance and Rivplume5 calculations are presented below.

Table 12: Comparison of Proposed and Existing Dilution Factors

Dilution Zone	Mass-balance Dilution Factors	Rivplume5 Dilution Factors	Existing Dilution Factors
Acute	4.0	61.1	1.45
Chronic	38.2	94.8	10.8

Dilution factors based on the mass-balance calculations are more conservative than the spreadsheet results; therefore, the dilution factors based on the mass-balance calculations are the revised dilution factors in the proposed permit. These revised dilution factors have increased from those in the previous permit because of (1) the change in the river management regime, and (2) the reduction of flows discharged from the treatment plant. The change in the river management program has already been discussed. Reduction of effluent flow volumes is due to a combination of factors. Dilution factors in the existing permit were influenced by the high effluent flows resulting from several severe storm events that occurred in 1996 and 1997. No large storm events have occurred during the existing permit cycle, so the effluent flows (Q_e) used in the calculation of dilution factors were smaller. In addition, effluent flows have been reduced over the past ten years by the City's ongoing efforts to reduce I&I in the collection system. For further discussion concerning the reduction of I&I, see Table 1 and the associated narrative earlier in this fact sheet.

Its worth noting that, despite the increased dilution factors, the Department still considers them conservative in an absolute sense. This is because the season in which the discharge exerts its greatest impact on the river does not correspond to low-flow season of the river. The time at which the constituents in the City's discharge (ammonia and temperature) exerts their greatest demand on the river is in the warm-weather months of July, August, and September, when river flows typically range from 1,000 cfs to 4,000 cfs. The low-flow season of the river is typically November through February, after the end of the irrigation season. At that time the Bureau minimizes discharges from the five upstream reservoirs to begin storing water for the next irrigation season. In summary, the Department considers the revised dilution factors of 4.0 (acute) and 38.2 (chronic) are reasonable adjustments to the existing values using the most current data and will be protective of water quality of the Yakima River.

Description of the Receiving Water

The facility discharges to the Yakima River, which is designated as a Class A receiving water in the vicinity of the outfall. There are no nearby point source dischargers. Significant nearby non-point potential sources of pollutants include agricultural fields, the Twin City Foods industrial sprayfield, and storm water runoff. Characteristic uses include the following:

water supply (domestic, industrial, agricultural); stock watering; fish migration; fish rearing, spawning and harvesting; wildlife habitat; primary contact recreation; sport fishing; boating and aesthetic enjoyment; commerce and navigation. Water quality of this class shall meet or exceed the requirements for all or substantially all uses.

Surface Water Quality Criteria

Applicable criteria are defined in Chapter 173-201A WAC for aquatic biota. The State adopted new surface water quality standards in July 2003; however, these standards are undergoing review by U. S. EPA. Until final approval is granted by EPA, the applicable criteria are contained in the 1992 standards. In addition, U.S. EPA has promulgated human health criteria for toxic pollutants (EPA 1992). Criteria for this discharge are summarized below:

Table 13: Applicable Water Quality Criteria

Parameter	Criterion
Fecal Coliforms	100 organisms/100 mL maximum geometric mean
Dissolved Oxygen	8 mg/L minimum
Temperature	21 degrees Celsius maximum or incremental increases above background
pH	6.5 to 8.5 standard units
Turbidity	less than 5 NTUs above background
Toxics	No toxics in toxic amounts (see Appendix C for numeric criteria for toxics of concern for this discharge)

The temperature criterion of 21°C is a specific freshwater classification detailed in WAC 173-201A-130(141) that reads as follows: temperature shall not exceed 21.0°C due to human activities. When natural conditions exceed 21.0°C, no temperature increase will be allowed which will raise the receiving water temperature by greater than 0.3°C, nor shall such temperature increases, at any time, exceed $t=34/(T+9)$.

According to the 1998 303(d) list, this segment of the Yakima River is designated as water quality-impaired for the following parameters: 4,4'-DDE, DDT, Cadmium, Copper, and Mercury. Listings were based on sampling conducted by the U. S. Geological Survey (USGS) between 1987 and 1990 for the National Water Quality Assessment Program (NAWQA).

The Department of Ecology's Environmental Assessment Program (EAP) reviewed the draft 303(d) list and questioned the accuracy of the USGS metals data for the Yakima. Metals data generated by the USGS as part of a similar river monitoring program during this period were known to be subject to contamination. Although collected under different protocols, results from

the NAWQA study in the Upper Yakima were inconsistent with metals concentrations the Department had measured near the mouth of the river.

In response to the inconsistencies, the Department's Central Regional Office requested that EAP conduct additional monitoring to verify the 303(d) metals listings for the Upper Yakima River. Sampling was completed in January 2000 and the final report issued in June 2000. The report, *Concentrations of 303(d) Listed Metals in the Upper Yakima River*, Ecology Pub. No. 00-03-024, concluded that "all samples analyzed were well within State [water quality] standards for aquatic toxicity." The report recommended that "the upper Yakima River be removed from the 303(d) list for historically reported metals violations in the water column" (p. iii). The Department's study did not address the pesticide listings.

CONSIDERATION OF SURFACE WATER QUALITY-BASED LIMITS FOR NUMERIC CRITERIA

Pollutant concentrations in the proposed discharge exceed water quality criteria with technology-based controls which the Department has determined to be AKART. A mixing zone is authorized in accordance with the geometric configuration, flow restriction, and other restrictions for mixing zones in Chapter 173-201A WAC and are defined as follows:

The dilution factors of effluent to receiving water that occur within these zones have been determined at the critical condition as explained earlier in this fact sheet (see Mixing Zones). The dilution factors have been determined to be (from Appendix C):

Table 14: Applicable Dilution Factors

Mixing Zone Type	Acute	Chronic
Aquatic Life	4.0	38.2
Human Health, Carcinogen		38.2
Human Health, Non-carcinogen		38.2

WAC 173-201A-020 gives the Department discretion to utilize the 7Q10 flow to determine the human health dilution factors. Due to the conservative 7Q10 flow value used to calculate the aquatic life chronic dilution factor, this value is used to evaluate the human health constituents (bis-2-ethyhexyl phthalate and toluene) in the discharge to exceed the water quality criteria.

Pollutants in an effluent may affect the aquatic environment near the point of discharge (near field) or at a considerable distance from the point of discharge (far field). Toxic pollutants, for example, are near-field pollutants--their adverse effects diminish rapidly with mixing in the receiving water. Conversely, a pollutant such as BOD is a far-field pollutant whose adverse effect occurs away from the discharge even after dilution has occurred. Thus, the method of calculating water quality-based effluent limits varies with the point at which the pollutant has its maximum effect.

The derivation of water quality-based limits also takes into account the variability of the pollutant concentrations in both the effluent and the receiving water.

Data used to determine the reasonable potential for the discharge to exceed the water quality standards are presented in the following table:

Table 15: Data Used for Reasonable Potential Determination

Parameter	Value used
7Q10 low flow	792 cfs
Velocity	1 ft/sec
Depth	5 feet
Width	120 feet
Slope	0.035 ft/ft
Temperature	18.5° C
pH (high)	7.5
Dissolved Oxygen	8.0 mg/L

BOD₅--Under critical conditions there is no predicted violation of the Water Quality Standards for Surface Waters. The single highest concentration of BOD₅ discharged from the City during 2004 was 8.5 mg/L; typical concentrations are between 3 mg/L and 6 mg/L. In the best professional judgment of the Department the oxygen-demanding impacts of the discharge to the receiving water are minimal. Therefore, the technology-based effluent limitations for BOD₅ were placed in the permit.

Temperature--The highest single discharge temperature reported by the City during 2004 was 20°C, which complies with the 21°C criterion without the benefit of dilution. Therefore, no effluent limitation for temperature was placed in the proposed permit.

pH--The lowest pH reported by the City during 2004 was 6.7 and the highest 7.4, which complies with the water quality criteria of 6.5 and 8.5 without the benefit of dilution. Therefore, the technology-based effluent limitations for pH were placed in the permit.

Fecal coliform--The single highest fecal coliform bacteria count reported to the Department for 2004 was 76 colonies and the annual average was 3 which complies with the criteria without the benefit of dilution. Therefore, the technology-based effluent limitation for fecal coliform bacteria was placed in the proposed permit.

Toxic Pollutants--Federal regulations (40 CFR 122.44) require NPDES permits to contain effluent limits for toxic chemicals in an effluent whenever there is a reasonable potential for those chemicals to exceed the surface water quality criteria. This process occurs concurrently with the derivation of technology-based effluent limits. Facilities with technology-based effluent

limits defined in regulation are not exempted from meeting the Water Quality Standards for Surface Waters or from having surface water quality-based effluent limits.

The following toxics were determined to be present in the discharge: ammonia, chloride, copper, zinc, bis(2-ethylhexyl)phthalate and toluene. A reasonable potential analysis (See Appendix C) to exceed the aquatic life criteria was conducted on ammonia, chloride, copper, and zinc to determine whether or not effluent limitations would be required in this permit. Bis(2-ethylhexyl)phthalate and toluene have human health criteria only and are addressed later in this fact sheet.

The determination of the reasonable potential for ammonia, chloride, copper and zinc to exceed the water quality criteria for aquatic life was evaluated with procedures given in EPA, 1991 (Appendix C) at the critical condition. The critical condition in this case occurs July, August, and September. The parameters used in the critical condition modeling are as follows: acute dilution factor 4.0, chronic dilution factor 38.2, receiving water temperature 18.5°C, receiving water pH 7.5.

Ammonia

A reasonable potential determination for ammonia in the discharge to exceed the water quality criteria was conducted using the criteria developed in the existing permit and effluent data from 2004. Criteria from the existing permit were used because there are no receiving water pH data available, which is a key component of the criteria. The proposed permit requires the City to conduct receiving water monitoring to collect data for the next permit.

The maximum daily effluent limit of 8.2 mg/L was established in the 1996 permit. (See p.14 of the 1996 fact sheet.) The fact sheet does not contain calculations, nor any further documentation, of how the limit was derived. This limit is retained in the proposed permit because the increased dilution factors established in this permit would result in a higher limit, which would constitute backsliding, contrary to State and Federal regulations. The necessity for an ammonia limit will be reevaluated at the next permit renewal.

The Department's standard spreadsheet used for reasonable potential determinations, REASPOT.XLS, can be found in Appendix C of this fact sheet. The analysis resulted in a finding of no reasonable potential for ammonia in the discharge to exceed the water quality criteria.

Chloride

The City accepted discharges of pea brine water from a local food processor during early July 2005. Effluent samples from the City's treatment plant were analyzed to quantify impacts to the receiving water. A reasonable potential determination for chloride in the discharge to exceed the water quality criteria was conducted using this effluent data and the established criteria in WAC

173-201A-040. The Department's standard spreadsheet used for reasonable potential determinations, REASPOT.XLS, can be found in Appendix C of this fact sheet. The analysis resulted in a finding of no reasonable potential for chloride in the discharge to exceed the water quality criteria.

Copper and Zinc

The two metals detected in the City's effluent were copper and zinc. Calculation of the copper and zinc criteria are based on hardness. The initial reasonable potential determination, using only the receiving water hardness, found slight toxicity for copper in the acute mixing zone. (Using a maximum effluent concentration of 6.6, there was no reasonable potential; however, when the actual maximum concentration of 6.7 was inserted, reasonable potential resulted.) Therefore, hardness within the acute and chronic mixing zones were calculated using a mass-balance algorithm, incorporating the receiving water and effluent hardness concentrations, and the applicable dilution factors (see Appendix C). The resulting hardness concentrations are:

Table 16: Mixing Zone Hardness Concentrations

Parameter	Acute Mixing Zone	Chronic Mixing Zone
Hardness, in mg/L as CaCO ₃	49.8	36.5

Next, the copper and zinc criteria were calculated using the applicable hardness value. The criteria were developed using the Department's standard spreadsheet, CRITERIA.XLS (see Appendix C). Water quality criteria for metals in Chapter 173-201A WAC are based on the dissolved fraction of the metal. The criteria are:

Table 17: Metals Criteria

Parameter	Acute	Chronic
Copper, in µg/L	8.82	4.80
Zinc, in µg/L	63.40	44.49

The criteria were then used in the REASPOT spreadsheet to determine reasonable potential. The analysis resulted in a finding of no reasonable potential for copper and zinc in the discharge to exceed the water quality criteria (see Appendix C).

Whole Effluent Toxicity

The Water Quality Standards for Surface Waters require that the effluent not cause toxic effects in the receiving waters. Many toxic pollutants cannot be detected by commonly available detection methods. However, toxicity can be measured directly by exposing living organisms to the wastewater in laboratory tests and measuring the response of the organisms. Toxicity tests measure the aggregate toxicity of the whole effluent and, therefore, this approach is called whole

effluent toxicity (WET) testing. Some WET tests measure acute toxicity and other WET tests measure chronic toxicity.

Acute toxicity tests measure mortality as the significant response to the toxicity of the effluent. Dischargers who monitor their wastewater with acute toxicity tests are providing an indication of the potential lethal effect of the effluent to organisms in the receiving environment.

Chronic toxicity tests measure various sublethal toxic responses such as retarded growth or reduced reproduction. Chronic toxicity tests often involve either a complete life cycle test of an organism with an extremely short life cycle or a partial life cycle test on a critical stage of one of a test organism's life cycles. Organism survival is also measured in some chronic toxicity tests.

Accredited WET testing laboratories have the proper WET testing protocols, data requirements, and reporting format. Accredited laboratories are knowledgeable about WET testing and capable of calculating an NOEC, LC₅₀, EC₅₀, IC₂₅, etc. All accredited labs have been provided the most recent version of the Department of Ecology Publication # WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria* which is referenced in the permit. Any Permittee interested in receiving a copy of this publication may call the Ecology Publications Distribution Center 360-407-7472 for a copy. Ecology recommends that Permittees send a copy of the acute or chronic toxicity sections(s) of their permits to their laboratory of choice.

The WET tests during effluent characterization indicated that no reasonable potential exists to cause receiving water acute toxicity. The Permittee will not be given WET limits and will only be required to retest the effluent prior to application for permit renewal in order to demonstrate that acute toxicity has not increased in the effluent.

If the Permittee makes process or material changes which, in the Department's opinion, result in an increased potential for effluent toxicity, then the Department may require additional effluent characterization in a regulatory order, by permit modification, or in the permit renewal. Toxicity is assumed to have increased if WET testing conducted for submission with a permit application fails to meet the performance standards in WAC 173-205-020, "whole effluent toxicity performance standard". The Permittee may demonstrate to the Department that changes have not increased effluent toxicity by performing additional WET testing after the time the process or material changes have been made.

Human Health

Washington's water quality standards now include 91 numeric health-based criteria that must be considered in NPDES permits. These criteria were promulgated for the State by the U.S. EPA in its National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992).

Two constituents present in the City's discharge have human health criteria: bis(2-ethylhexyl) phthalate and toluene. A determination of the discharge's potential to cause an exceedance of the

water quality standards was conducted, as required by 40 CFR 122.44(d). The Department's standard spreadsheet developed for this purpose, HUMAN-H.XLS, was used for this determination (see Appendix C). The reasonable potential determination was evaluated with procedures given in the Technical Support Document for Water Quality-Based Toxics Control (EPA/505/2-90-001) and the Department's Permit Writer's Manual (Ecology Publication 92-109, July, 1994). The determination indicated that the discharge has no reasonable potential to cause a violation of water quality standards; therefore, an effluent limit is not warranted. The Permittee's discharge will be reevaluated for compliance with the human health criteria at the next permit renewal.

Sediment Quality

The Department has promulgated aquatic sediment standards (Chapter 173-204 WAC) to protect aquatic biota and human health. These standards state that the Department may require Permittees to evaluate the potential for the discharge to cause a violation of applicable standards (WAC 173-204-400).

The Department has determined through a review of the discharger characteristics and effluent characteristics that this discharge has no reasonable potential to violate the Sediment Management Standards.

GROUND WATER QUALITY LIMITATIONS

The Department has promulgated Ground Water Quality Standards (Chapter 173-200 WAC) to protect uses of ground water. Permits issued by the Department shall be conditioned in such a manner so as not to allow violations of those standards (WAC 173-200-100).

This Permittee has no discharge to ground; therefore, no limitations are required based on potential effects to ground water.

COMPARISON OF EFFLUENT LIMITS WITH THE EXISTING PERMIT

The effluent limits in the proposed permit remain unchanged from the previous permit.

MONITORING REQUIREMENTS

Monitoring, recording, and reporting are required (WAC 173-220-210 and 40 CFR 122.41) to verify that the treatment process is functioning correctly and the effluent limitations are being achieved.

Special Condition S8 of this permit requires the City to characterize the Yakima River and its effluent for the priority pollutant metals. This is a standard permit condition for dischargers

classified as majors. This is a new permit requirement because the data from monitoring carried out by the Department in 1999 was used for the existing permit. The permit requires quarterly sampling and analysis of at least eight receiving water samples and eight effluent samples. The resulting data will be used at permit renewal to evaluate the potential of metals in the City's discharge to exceed the water quality standards.

Special Condition S2.A of the proposed permit also requires the City to characterize the river for temperature and pH during the warm weather months of July, August and September throughout the permit cycle. These data will be utilized at permit renewal to calculate ammonia criteria and to conduct reasonable potential analyses for temperature and pH in the discharge to exceed the surface water quality criteria. In the event the City can access verifiable data from other sources, like the Department's ongoing stream monitoring activities, monitoring associated with nearby TMDL activities, or the Kittitas Reclamation District's stream monitoring program, then the City is encouraged to contact its NPDES Permit Manager to determine whether such data will fulfill the requirements of this permit.

The monitoring schedule is detailed in the proposed permit under Special Condition S2. Specified monitoring frequencies take into account the quantity and variability of discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring. The required monitoring frequencies are less than recommended in the current version of Ecology's *Permit Writer's Manual* (July 1994) for an activated sludge plant with a design flow of greater than (>) 5 MGD. For instance, the manual recommends BOD and TSS in the effluent be tested five times per week; however, the existing and proposed permits require only three times per week. In addition, a municipal discharger categorized as a 'major' would usually be required to carry out a more intensive monitoring program for toxics in the influent and effluent. The required monitoring program has been reduced because (1) the treatment plant has only one industrial facility discharging to it, and (2) historically, the City has had an exemplary record of compliance. The industrial user discharges repack process water and non-contact cooling water without chemical additives.

Additional monitoring is required in order to further characterize the effluent. These monitored pollutants could have a significant impact on the quality of the surface water.

LAB ACCREDITATION

With the exception of certain parameters the permit requires all monitoring data to be prepared by a laboratory registered or accredited under the provisions of Chapter 173-50 WAC, *Accreditation of Environmental Laboratories*. The laboratory at this facility is accredited for: ammonia, BOD/carbonaceous BOD (CBOD), DO, pH, TSS and fecal coliform bacteria.

OTHER PERMIT CONDITIONS

REPORTING AND RECORDKEEPING

The provisions of Special Condition S3. are based on the authority to specify any appropriate reporting and recordkeeping requirements to prevent and control waste discharges (WAC 173-220-210).

PREVENTION OF FACILITY OVERLOADING

Overloading of the treatment plant is a violation of the terms and conditions of the permit. To prevent this from occurring, RCW 90.48.110 and WAC 173-220-150 require the Permittee to take the actions detailed in Special Condition S4. to plan expansions or modifications before existing capacity is reached and to report and correct conditions that could result in new or increased discharges of pollutants. Special Condition S4. restricts the amount of flow.

OPERATION AND MAINTENANCE (O&M)

The proposed permit contains Special Condition S5. as authorized under RCW 90.48.110, WAC 173-220-150, Chapter 173-230 WAC, and WAC 173-240-080. It is included to ensure proper operation and regular maintenance of equipment, and to ensure that adequate safeguards are taken so that constructed facilities are used to their optimum potential in terms of pollutant capture and treatment.

The City submitted an updated O&M Manual to the Department for review in February 2001. The Department approved the manual in June 2001. The treatment plant processes have not been substantially modified since 2001. In the event significant physical or operational modifications are implemented at the plant during the permit cycle, the City is required to submit updates to the manual to reflect the changes. Otherwise, the City is required to certify, in writing, with the application for permit renewal, that changes to the O&M Manual were not necessary.

RESIDUAL SOLIDS HANDLING

To prevent water quality problems the Permittee is required in Special Condition S7. to store and handle all residual solids (grit, screenings, scum, sludge, and other solid waste) in accordance with the requirements of RCW 90.48.080 and State Water Quality Standards.

The final use and disposal of sewage sludge from this facility is regulated by U.S. EPA under 40 CFR 503, and by Ecology under Chapter 173-308 WAC, "Biosolids Management". The disposal of other solid waste is under the jurisdiction of the Kittitas County Health Department.

PRETREATMENT

The City of Ellensburg has not been delegated pretreatment authority because the POTW has only one significant industrial user (SIU) discharging to it, and on a seasonal basis only. The SIU is Twin City Foods, a vegetable processor, that discharges approximately 38,000 gallons per day of non-contact cooling water to the treatment plant during the winter months. Historically, this relatively small volume of cooling water has not adversely impacted treatment processes at the plant. However, the City is required to comply with the general pretreatment requirements detailed in Special Condition S6. of the permit.

Duty to Enforce Discharge Prohibitions

This provision prohibits the POTW from authorizing or permitting an industrial discharger to discharge certain types of waste into the sanitary sewer. The first portion of the provision prohibits acceptance of pollutants which cause pass through or interference. The definitions of pass through and interference are in Appendix B of the fact sheet.

The second portion of this provision prohibits the POTW from accepting certain specific types of wastes, namely those which are explosive, flammable, excessively acidic, basic, otherwise corrosive, or obstructive to the system. In addition wastes with excessive BOD, petroleum based oils, or which result in toxic gases are prohibited to be discharged. The regulatory basis for these prohibitions is 40 CFR Part 403, with the exception of the pH provisions which are based on WAC 173-216-060.

The third portion of this provision prohibits certain types of discharges unless the POTW receives prior authorization from the Department. The discharges include cooling water in significant volumes, stormwater and other direct inflow sources, and wastewaters significantly affecting system hydraulic loading, which do not require treatment. Although the City accepts noncontact cooling water from Twin City Foods, the volumes discharged have not historically impacted treatment processes.

COMBINED SEWER OVERFLOWS

In accordance with RCW 90.48.480 and Chapter 173-245 WAC, proposed permit Special Condition S11 requires the Permittee to update its Combined Sewer Overflow (CSO) reduction plan at the time of permit renewal. Special Condition S4.E requires the City to submit annual I&I Evaluations, that includes updates of the City's ongoing efforts to reduce I&I, separate the storm and sanitary collection systems, and remove storm water catch basins from the sanitary collection system.

GENERAL CONDITIONS

General Conditions are based directly on State and Federal law and regulations and have been standardized for all individual municipal NPDES permits issued by the Department.

PERMIT ISSUANCE PROCEDURES

PERMIT MODIFICATIONS

The Department may modify this permit to impose numerical limitations, if necessary to meet Water Quality Standards, Sediment Quality Standards, or Ground Water Standards, based on new information obtained from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

The Department may also modify this permit as a result of new or amended State or Federal regulations.

RECOMMENDATION FOR PERMIT ISSUANCE

This proposed permit meets all statutory requirements for authorizing a wastewater discharge, including those limitations and conditions believed necessary to protect human health, aquatic life, and the beneficial uses of waters of the State of Washington. The Department proposes that this permit be issued for 5 years.

REFERENCES FOR TEXT AND APPENDICES

Environmental Protection Agency (EPA)

1992. National Toxics Rule. Federal Register, V. 57, No. 246, Tuesday, December 22, 1992.

1991. Technical Support Document for Water Quality-based Toxics Control. EPA/505/2-90-001.

1988. Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling. USEPA Office of Water, Washington, D.C.

1985. Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants in Surface and Ground Water. EPA/600/6-85/002a.

1983. Water Quality Standards Handbook. USEPA Office of Water, Washington, D.C.

HDR Engineering, Inc.

2001. City of Ellensburg Wastewater-Storm Sewer Study.

Metcalf and Eddy.

1991. Wastewater Engineering, Treatment, Disposal, and Reuse. Third Edition.

Tsivoglou, E.C., and J.R. Wallace.

1972. Characterization of Stream Reaeration Capacity. EPA-R3-72-012. (Cited in EPA 1985 op.cit.)

Washington State Department of Ecology.

Laws and Regulations(<http://www.ecy.wa.gov/laws-rules/index.html>)

Permit and Wastewater Related Information
(<http://www.ecy.wa.gov/programs/wq/wastewater/index.html>)

Washington State Department of Ecology.

1994. Permit Writer's Manual. Publication Number 92-109

Water Pollution Control Federation.

1976. Chlorination of Wastewater.

Wright, R.M., and A.J. McDonnell.

1979. In-stream Deoxygenation Rate Prediction. Journal Environmental Engineering Division, ASCE. 105(E2). (Cited in EPA 1985 op.cit.)

APPENDIX A -- PUBLIC INVOLVEMENT INFORMATION

The Department has tentatively determined to reissue a permit to the applicant listed on page 1 of this fact sheet. The permit contains conditions and effluent limitations which are described in the rest of this fact sheet.

Public notice of application was published on June 21, 2005 in the Ellensburg Daily Record and Yakima Herald Republic to inform the public that an application had been submitted and to invite comment on the reissuance of this permit.

The Department will publish a Public Notice of Draft (PNOD) on September 14, 2005 in the Ellensburg Daily Record to inform the public that a draft permit and fact sheet are available for review. Interested persons are invited to submit written comments regarding the draft permit. The draft permit, fact sheet, and related documents are available for inspection and copying between the hours of 8:00 a.m. and 5:00 p.m. weekdays, by appointment, at the regional office listed below. Written comments should be mailed to:

Water Quality Permit Coordinator
Department of Ecology
Central Regional Office
15 West Yakima Avenue, Suite 200
Yakima, WA 98902

Any interested party may comment on the draft permit or request a public hearing on this draft permit within the 30 day comment period to the address above. The request for a hearing shall indicate the interest of the party and the reasons why the hearing is warranted. The Department will hold a hearing if it determines there is a significant public interest in the draft permit (WAC 173-220-090). Public notice regarding any hearing will be circulated at least 30 days in advance of the hearing. People expressing an interest in this permit will be mailed an individual notice of hearing (WAC 173-220-100).

Comments should reference specific text followed by proposed modification or concern when possible. Comments may address technical issues, accuracy and completeness of information, the scope of the facility's proposed coverage, adequacy of environmental protection, permit conditions, or any other concern that would result from issuance of this permit.

The Department will consider all comments received within 30 days from the date of public notice of draft indicated above, in formulating a final determination to issue, revise, or deny the permit. The Department's response to all significant comments is available upon request and will be mailed directly to people expressing an interest in this permit.

Further information may be obtained from the Department by telephone, 509/457-7105, or by writing to the address listed above.

APPENDIX B -- GLOSSARY

Acute Toxicity--The lethal effect of a pollutant on an organism that occurs within a short period of time, usually 48 to 96 hours.

AKART-- An acronym for "all known, available, and reasonable methods of prevention, control, and treatment".

Ambient Water Quality--The existing environmental condition of the water in a receiving water body.

Ammonia--Ammonia is produced by the breakdown of nitrogenous materials in wastewater. Ammonia is toxic to aquatic organisms, exerts an oxygen demand, and contributes to eutrophication. It also increases the amount of chlorine needed to disinfect wastewater.

Average Monthly Discharge Limitation --The highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month (except in the case of fecal coliform). The daily discharge is calculated as the average measurement of the pollutant over the day.

Average Weekly Discharge Limitation -- The highest allowable average of daily discharges over a calendar week, calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week. The daily discharge is calculated as the average measurement of the pollutant over the day.

Best Management Practices (BMPs)--Schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the State. BMPs include treatment systems, operating procedures, and practices to control: plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

BOD₅--Determining the Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD₅ is used in modeling to measure the reduction of dissolved oxygen in a receiving water after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD is not a specific compound, it is defined as a conventional pollutant under the Federal Clean Water Act.

Bypass--The intentional diversion of waste streams from any portion of a treatment facility.

CBOD₅ -- The quantity of oxygen utilized by a mixed population of microorganisms acting on the nutrients in the sample in an aerobic oxidation for five days at a controlled temperature of 20 degrees Celsius, with an inhibitory agent added to prevent the oxidation of nitrogen compounds. The method for determining CBOD₅ is given in 40 CFR Part 136.

Chlorine--Chlorine is used to disinfect wastewaters of pathogens harmful to human health. It is also extremely toxic to aquatic life.

Chronic Toxicity--The effect of a pollutant on an organism over a relatively long time, often 1/10 of an organism's lifespan or more. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters to measure the toxic effects of a compound or combination of compounds.

Clean Water Act (CWA)--The Federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; USC 1251 et seq.

Combined Sewer Overflow (CSO)--The event during which excess combined sewage flow caused by inflow is discharged from a combined sewer, rather than conveyed to the sewage treatment plant because either the capacity of the treatment plant or the combined sewer is exceeded.

Compliance Inspection - Without Sampling--A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations.

Compliance Inspection - With Sampling--A site visit to accomplish the purpose of a Compliance Inspection - Without Sampling and as a minimum, sampling and analysis for all parameters with limits in the permit to ascertain compliance with those limits; and, for municipal facilities, sampling of influent to ascertain compliance with the percent removal requirement. Additional sampling may be conducted.

Composite Sample--A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing a minimum of four discrete samples. May be "time-composite" (collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots).

Construction Activity--Clearing, grading, excavation and any other activity which disturbs the surface of the land. Such activities may include road building, construction of residential houses, office buildings, or industrial buildings, and demolition activity.

Continuous Monitoring--Uninterrupted, unless otherwise noted in the permit.

Critical Condition--The time during which the combination of receiving water and waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. This situation usually occurs when the flow within a water body is low, thus, its ability to dilute effluent is reduced.

Dilution Factor--A measure of the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. Expressed as the inverse of the effluent fraction e.g., a dilution factor of 10 means the effluent comprises 10% by volume and the receiving water 90%.

Engineering Report--A document which thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report shall contain the appropriate information required in WAC 173-240-060 or 173-240-130.

Fecal Coliform Bacteria--Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the wastewater. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces.

Grab Sample--A single sample or measurement taken at a specific time or over a short period of time as is feasible.

Industrial User-- A discharger of wastewater to the sanitary sewer which is not sanitary wastewater or is not equivalent to sanitary wastewater in character.

Industrial Wastewater--Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business, from the development of any natural resource, or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated storm water and, also, leachate from solid waste facilities.

Infiltration and Inflow (I/I)--"Infiltration" means the addition of ground water into a sewer through joints, the sewer pipe material, cracks, and other defects. "Inflow" means the addition of precipitation-caused drainage from roof drains, yard drains, basement drains, street catch basins, etc., into a sewer.

Interference -- A discharge which, alone or in conjunction with a discharge or discharges from other sources, both:

Inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use or disposal and;

Therefore is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation) or of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent State or local regulations): Section 405 of the Clean Water Act, the Solid Waste Disposal Act (SWDA) (including title II, more commonly referred to as the Resource Conservation and Recovery Act (RCRA), and including State regulations contained in any State sludge management plan prepared pursuant to subtitle D of the SWDA), sludge regulations appearing in 40 CFR Part 507, the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection, Research and Sanctuaries Act.

Major Facility--A facility discharging to surface water with an EPA rating score of > 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Maximum Daily Discharge Limitation--The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is calculated as the average measurement of the pollutant over the day.

Method Detection Level (MDL)--The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is above zero and is determined from analysis of a sample in a given matrix containing the analyte.

Minor Facility--A facility discharging to surface water with an EPA rating score of < 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Mixing Zone--A volume that surrounds an effluent discharge within which water quality criteria may be exceeded. The area of the authorized mixing zone is specified in a facility's permit and follows procedures outlined in State regulations (Chapter 173-201A WAC).

National Pollutant Discharge Elimination System (NPDES)--The NPDES (Section 402 of the Clean Water Act) is the Federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the State of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington State permit writers are joint NPDES/State permits issued under both State and Federal laws.

Pass through -- A discharge which exits the POTW into waters of the-State in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation), or which is a cause of a violation of State water quality standards.

pH--The pH of a liquid measures its acidity or alkalinity. A pH of 7 is defined as neutral, and large variations above or below this value are considered harmful to most aquatic life.

Potential Significant Industrial User--A potential significant industrial user is defined as an Industrial User which does not meet the criteria for a Significant Industrial User, but which discharges wastewater meeting one or more of the following criteria:

- a. Exceeds 0.5 % of treatment plant design capacity criteria and discharges <25,000 gallons per day or;
- b. Is a member of a group of similar industrial users which, taken together, have the potential to cause pass through or interference at the POTW (e.g. facilities which develop photographic film or paper, and car washes).

The Department may determine that a discharger initially classified as a potential significant industrial user should be managed as a significant industrial user.

Quantitation Level (QL)-- A calculated value five times the MDL (method detection level).

Significant Industrial User (SIU)--

- 1) All industrial users subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N and;
- 2) Any other industrial user that: discharges an average of 25,000 gallons per day or more of process wastewater to the POTW (excluding sanitary, noncontact cooling, and boiler blow-down wastewater); contributes a process wastestream that makes up 5 percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant; or is designated as such by the Control Authority* on the basis that the industrial user has a reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement (in accordance with 40 CFR 403.8(f)(6)).

Upon finding that the industrial user meeting the criteria in paragraph 2, above, has no reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement, the Control Authority* may at any time, on its own initiative or in response to a petition received from an industrial user or POTW, and in accordance with 40 CFR 403.8(f)(6), determine that such industrial user is not a significant industrial user.

*The term "Control Authority" refers to the Washington State Department of Ecology in the case of non-delegated POTWs or to the POTW in the case of delegated POTWs.

State Waters--Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, wetlands, and all other surface waters and watercourses within the jurisdiction of the State of Washington.

Stormwater--That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a storm water drainage system into a defined surface water body, or a constructed infiltration facility.

Technology-based Effluent Limit--A permit limit that is based on the ability of a treatment method to reduce the pollutant.

Total Suspended Solids (TSS)--Total suspended solids are the particulate materials in an effluent. Large quantities of TSS discharged to a receiving water may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

Upset--An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventative maintenance, or careless or improper operation.

Water Quality-based Effluent Limit--A limit on the concentration or mass of an effluent parameter that is intended to prevent the concentration of that parameter from exceeding its water quality criterion after it is discharged into a receiving water.

APPENDIX C -- TECHNICAL CALCULATIONS

Calculation of Proposed Dilution Factors

Potential dilution factors were calculated using the mass-balance and RIVPLUME5 methodologies. The mass-balance calculations are presented on this page and the Department's standard RIVPLUME5 spreadsheet appears on the following page.

Mass-balance Calculations

$$\text{Algorithm: } DF = (Q_a + Q_e)/Q_e$$

where: DF = Dilution factor

Q_a = Ambient flow volume of Yakima River, 7Q10 (low flow) value = 792 cfs

Q_e = Effluent flow volume.

Acute

$Q_a = 2.5\% \text{ of } 7Q_{10} = 19.8 \text{ cfs}$

$Q_e = 6.61 \text{ cfs}$ (Highest reported maximum daily flow)

$DF_a = (19.8 + 6.61)/6.61 = 3.995$, rounded to 4

Chronic

$Q_a = 25\% \text{ of } 7Q_{10} = 198 \text{ cfs}$

$Q_e = 5.32 \text{ cfs}$ (Highest reported average monthly flow)

$DF_c = (198 + 5.32)/5.32 = 38.2$

Spread of a plume from a point source in a river with boundary effects from the shoreline
based on the method of Fischer *et al.* (1979) with correction for the effective origin of effluent.

Revised 22-Feb-96

DILUTION FACTORS		Acute	Chronic
INPUT			
1. Effluent Discharge Rate (cfs): Max daily & max monthly discharges, both in June 2004		6.61	5.32
2. Receiving Water Characteristics Downstream From Waste Input			
Stream Depth (ft): Conservative estimate from direct observation		5.00	5.00
Stream Velocity (fps): Estimate from direct observation		1.00	1.00
Channel Width (ft): Estimate from direct observation		120.00	120.00
Stream Slope (ft/ft) or Manning roughness "n": Estimate		0.035	0.035
0 if slope or 1 if Manning "n" in previous cell:		0	0
3. Discharge Distance From Nearest Shoreline (ft): From 2001 wastewater study		20	20
4. Location of Point of Interest to Estimate Dilution			
Distance Downstream to Point of Interest (ft):		30	310
Distance From Nearest Shoreline (ft):		40	40
5. Transverse Mixing Coefficient Constant (usually 0.6):		0.6	0.6
6. Original Fischer Method (enter 0) or <i>Effective Origin</i> Modification (enter 1)		0	0
OUTPUT			
1. Source Conservative Mass Input Rate			
Concentration of Conservative Substance (%):		100.00	100.00
Source Conservative Mass Input Rate (cfs*%):		661.00	532.00
2. Shear Velocity			
Shear Velocity based on slope (ft/sec):		2.374	2.374
Shear Velocity based on Manning "n":			
using Prasuhn equations 8-26 and 8-54 assuming			
hydraulic radius equals depth for wide channel			
Darcy-Weisbach friction factor "f":		#N/A	#N/A
Shear Velocity from Darcy-Weisbach "f" (ft/sec):		#N/A	#N/A
Selected Shear Velocity for next step (ft/sec):		2.374	2.374
3. Transverse Mixing Coefficient (ft ² /sec):		7.121	7.121
4. Plume Characteristics Accounting for Shoreline Effect (Fischer <i>et al.</i> , 1979)			
Co		1.10E+00	8.87E-01
x'		1.48E-02	1.53E-01
y'o		1.67E-01	1.67E-01
y' at point of interest		3.33E-01	3.33E-01
Solution using superposition equation (Fischer eqn 5.9)			
Term for n= -2		8.91E-128	5.11E-13
Term for n= -1		4.42E-35	5.11E-04
Term for n= 0		6.41E-01	1.62E+00
Term for n= 1		3.42E-17	2.97E-02
Term for n= 2		2.26E-90	2.15E-09
Upstream Distance from Outfall to <i>Effective Origin</i> of Effluent Source (ft)		#N/A	#N/A
Effective Distance Downstream from Effluent to Point of Interest (ft)		30.00	310.00
x' Adjusted for <i>Effective Origin</i>		1.48E-02	1.53E-01
C/Co (dimensionless)		1.48E+00	1.19E+00
Concentration at Point of Interest (Fischer Eqn 5.9)		1.64E+00	1.05E+00
Unbounded Plume Width at Point of Interest (ft)		82.684	265.791
Unbounded Plume half-width (ft)		41.342	132.895
Distance from near shore to discharge point (ft)		20.00	20.00
Distance from far shore to discharge point (ft)		100.00	100.00
Plume width bounded by shoreline (ft)		61.34	120.00
Approximate Downstream Distance to Complete Mix (ft):		562	562
Theoretical Dilution Factor at Complete Mix:		90.772	112.782
Calculated Flux-Average Dilution Factor Across Entire Plume Width:		46.401	112.782
Calculated Dilution Factor at Point of Interest:		61.143	94.811

WATER QUALITY CRITERIA

SPREADSHEET CREATED BY D. NUNNALLEE, REV. 1-92 BY G. SHERVEY								
Last revision date 9/01			FILENAME:					
FACILITY:			RUN DATE:	9/2/2005				
			PREPARED BY:					
WATER QUALITY CRITERIA (in ug/L unless otherwise noted)								
			PRIOR	CAR	Water Quality Criteria	Human Health Criteria		Metals Translators
			ITY	CIN			Source and	
Pollutant, CAS No. & Application Ref. No.	PLTNT	GEN?	acute	chronic	Fresh		Comments	Acute Chronic
CHLORINE 7782505	N	N	19	11			WAC 173-201A	
ARSENIC (dissolved) 7440382 2M	Y	Y	360	190			WAC 173-201A	1.00 1.00
CADMIUM - 7440439 4M Hardness dependent	Y	N	2.21	0.72			WAC 173-201A	0.943 0.943
CHROMIUM(HEX) 18540299	Y	N	15	10			WAC 173-201A	0.982 0.962
COPPER - 744058 6M Hardness dependent	Y	N	10.85	7.54			WAC 173-201A	0.996 0.996
CYANIDE 57125 14M	Y	N	22	5.20	700		WAC 173-201A, NTR	
LEAD - 7439921 7M Dependent on hardness	Y	N	38.24	1.49			WAC 173-201A,	0.466 0.466
MERCURY 7439976 8M	Y	N	2.10	0.012	0.14		WAC 173-201A, NTR - HH	0.85
NICKEL - 7440020 9M - Dependent on hardness	Y	N	944.59	104.90	610		WAC 173-201A, NTR	0.998 0.997
SILVER - 7740224 11M dependent on hardness.	Y	N	1.52	NA			SEE WAC 173-201A, acute level no	0.85
ZINC- 7440666 13M hardness dependent	Y	N	76.33	69.70			WAC 173-201A,	0.996 0.996

REASONABLE POTENTIAL DETERMINATION

This spreadsheet calculates the reasonable potential to exceed state water quality standards for a small number of samples. The procedure and calculations are done per the procedure in <u>Technical Support Document for Water Quality-based Toxics Control</u> , U.S. EPA, March, 1991 (EPA/505/2-90-001) on page 56. User input columns are shown with red headings. Corrected formulas in col G and H on 5/98 (GB)									CALCULATIONS								
				State Water Quality Standard		Max concentration at edge of...											
	Metal Criteria Translator as decimal	Metal Criteria Translator as decimal	Ambient Concentration (metals as dissolved)	Acute	Chronic	Acute Mixing Zone	Chronic Mixing Zone	LIMIT REQ'D?	Effluent percentile value	Pn	Max effluent conc. measured (metals as total recoverable)	Coeff Variation	s	# of samples	Multiplier	Acute Di'n Factor	Chronic Di'n Factor
Parameter	Acute	Chronic	ug/L	ug/L	ug/L	ug/L	ug/L			Pn	ug/L	CV	s	n			
Chlorine				19.00	11.00	16.33	1.65	NO	0.95	0.975	800.00	0.60	0.55	120	0.84	41	405
Arsenic	1.000	1.000		360.00	190.00	0.30	0.03	NO	0.95	0.050	2.00	0.60	0.55	1	6.20	41	405
Cadmium	0.943	0.943		2.21	0.72	0.04	0.00	NO	0.95	0.050	0.30	0.60	0.55	1	6.20	41	405
Chromium (Hex)	0.982	0.962		15.00	10.00	0.70	0.07	NO	0.95	0.050	4.70	0.60	0.55	1	6.20	41	405
Copper	0.996	0.996		10.85	7.54	0.59	0.06	NO	0.95	0.050	3.90	0.60	0.55	1	6.20	41	405
Cyanide				22.00	5.20	0.00	0.00	NO	0.95	0.050	0.01	0.60	0.55	1	6.20	41	405
Lead	0.466	0.466		38.24	1.49	0.04	0.00	NO	0.95	0.050	0.50	0.60	0.55	1	6.20	41	405
Mercury	0.850			2.10	0.01	0.04	0.00	NO	0.95	0.050	0.30	0.60	0.55	1	6.20	41	405
Nickel	0.998	0.997		944.59	104.90	1.51	0.15	NO	0.95	0.050	10.00	0.60	0.55	1	6.20	41	405
Silver	0.850			1.52	150.00	0.51	0.06	NO	0.95	0.050	4.00	0.60	0.55	1	6.20	41	405
Zinc	0.996	0.996		76.33	69.70	7.23	0.73	NO	0.95	0.050	48.00	0.60	0.55	1	6.20	41	405
															#NUM!		
Note: There is no established chronic criterion for silver; however, the spreadsheet will not work without a number in the cell, so 150.00 was put in as a surrogate value.															#NUM!		
															#NUM!		
Note: Metals Criteria are based on a hardness of 62 mg/L, as CaCO3, as documented in the 2003 City of Wenatchee Receiving Water Study of the Columbia River.															#NUM!		

REASONABLE POTENTIAL DETERMINATION FOR THE PROTECTION OF HUMAN HEALTH

Revised 3/00	Water Quality Criteria for Protection of Human Health	Max concentration at edge of chronic mixing zone.		Expected Number of Compliance Samples per Month	AVERAGE MONTHLY EFFLUENT LIMIT	MAXIMUM DAILY EFFLUENT LIMIT	Estimated Percentile at 95% Confidence		Max effluent conc. measured	Coeff Variation		# of samples from which # in col. K was taken	Multiplier	Chronic Dilution Factor
Parameter	ug/L	ug/L	LIMIT REQ'D?		ug/L	ug/L		Pn	ug/L	CV	S	n		
Cyanide	700.00	0.06	NO	1	NONE	NONE	0.50	0.05	10.00	0.60	0.6	1	2.49	405
Mercury	0.14	0.00	NO	1	NONE	NONE	0.50	0.05	0.30	0.60	0.6	1	2.49	405
Nickel	610.00	0.06	NO	1	NONE	NONE	0.50	0.05	10.00	0.60	0.6	1	2.49	405

APPENDIX D -- RESPONSE TO COMMENTS

No comments were received by the Department of Ecology.